PLANT GENETIC RESOURCES
RESSOURCES GÉNÉTIQUES VÉGÉTALES
RECURSOS GENETICOS VEGETALES

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Editor: J.T. Williams, AGPE
FAO, 00100 Rome, Italy

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PLANT GENETIC RESOURCES NEWSLETTER

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AVANT-PROPOS

La FAO a entrepris la publication du Bulletin des ressources génétiques végétales à l'époque où les moyens d'information traitant de ce sujet étaient limités. Les communications scientifiques qu'il contenait, et dont les auteurs comptaient des savants du monde entier, ont mis en lumière l'importance des ressources génétiques végétales pour l'avenir de la phytologie. Ce Bulletin a beaucoup contribué à promouvoir l'activité internationale qui a conduit, en 1974, à la création du Conseil international des ressources phytogénétiques. Nous remercions vivement ici Sir Otto Frankel, F.R.S., F.A.A., Messieurs J.G. Hawkes, J.R. Harlan et M.S. Swaminathan, et tout particulièrement la rédactrice Mademoiselle Erna Bennett, de leurs efforts, de leur collaboration, et de l'attention assidue consacrée à la production de cette importante publication.

Dans le passé, ce Bulletin contenait surtout des documents et des rapports scientifiques; mais la création du CIRPG a stimulé les travaux relatifs aux ressources génétiques et un changement de style et de format s'imposait. Nous sommes heureux de présenter le premier numéro du nouveau Bulletin qui contient des articles, des notes et des informations sur les activités actuelles. Nous espérons grâce à lui, susciter un intérêt plus vif pour le réseau mondial d'activités concernant les ressources génétiques et le faire mieux connaître, alors même qu'il devient réalité.

Les objectifs du CIRPG sont orientés vers la sauvegarde de ressources génétiques végétales que l'introduction de variétés et hybrides nouvellement créés pourrait épuiser, mais il est tout aussi important que ces ressources soient immédiatement mises à la disposition de tous les sélectionneurs qui pourront les utiliser dans les meilleures conditions pour leurs travaux d'amélioration. C'est pour promouvoir cet objectif que le Bulletin contient des informations rapides et concises.

Ce Bulletin, qui entend tenir le lecteur informé des derniers progrès, est parrainé conjointement par la FAO et le CIRPG. Sa publication est assurée par le Groupe de l'écologie des cultures et des ressources génétiques de la Division de la production végétale et de la protection des plantes de la FAO qui fournit le Secrétariat du CIRPG et assure la coordination des activités de chaque organisation dans ce domaine.

PREFACIO

El Noticiario de Recursos Genéticos Vegetales empezó a publicarlo la Organización de las Naciones Unidas para la Agricultura y la Alimentación (FAO) en los días en que escaseaban las publicaciones que trataban de recursos genéticos. Sus aportaciones científicas, en las que han participado numerosos hombres de ciencia de todo el mundo, han puesto de relieve la importancia que tendrán los recursos genéticos de los cultivos para el futuro de la ciencia vegetal. Esta publicación ha sido un importante promotor de una acción internacional que culminó en 1974 con el establecimiento de la Junta Internacional de Recursos Fitogenéticos (IBPGR). Quede aquí constancia de los mas cordiales sentimientos de gratitud a que se han hecho acreedores los miembros del comité de redacción, Sir Otto Frankel, F.R.S., F.A.A., Profesor J.G. Hawkes, Profesor J.R. Harlan y Dr. M.S. Swaminathan y en especial el Director, Srta.Erna Bennett, por sus esfuerzos y contribuciones y por la constante atención que han dedicado a la producción de esta importante publicación.

En el pasado, el Noticiario sostenía mayormente trabajos e informes científicos pero la creación de la IBPGR ha acelerado los trabajos en materia de recursos fitogenéticos, y obligado en secuencia a cambiar el estilo y el formato. Nos complacemos en presentar el primer número de la nueva versión, que contiene reseñas, notas e información sobre actividades actualmente en curso. Abrigamos la esperanza de estimular por medio de esta publicación un mayor interés y conocimiento de la red mundial de actividades sobre recursos fitogenéticos que, actualmente en vias de creación, puede ya considerarse como una realidad.

La IBPGR se ha impuesto el objetivo de salvaguardar los recursos fitogenéticos que pudieran agotarse a causa de la introducción de nuevas variedades de híbridos; sin embargo, es igualmente importante que dichos recursos se encuentren a disposición immediata de los que se ocupan de mejora genética en todo el mundo para que puedan utilizarlos con el mayor provecho posible en sus trabajos de selección. La información rápida inmediata y concisa, que facilita el Noticiario responde al propósito de alcanzar ese objetivo.

Este Noticiario, que se propone tener a los lectores bien al corriente de la situación, está bajo el patrocinio conjunto de la FAO y la IBPGR. Su publicación incumbe a la Dependencia de Ecología de Cultivos y Recursos Genéticos de la Dirección de Producción y Protección Vegetal de la FAO, que proporciona la Secretaría del IBPGR y vela por que la labor de cada organización complete y amplíe la de la otra.

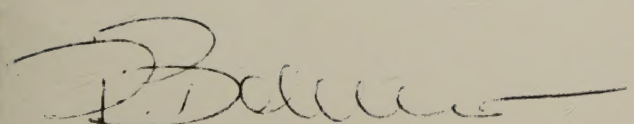
FOREWORD

The Plant Genetic Resources Newsletter was introduced by the Food and Agriculture Organization of the United Nations (FAO) in the days when the media dealing with genetic resources were limited. Its scientific contributions, in which numerous scientists throughout the world have participated, have highlighted the importance of crop genetic resources for the future of plant science. It has been an important instrument promoting international action which led to the establishment of the International Board for Plant Genetic Resources in 1974. Warmest thanks are expressed to the members of the editorial committee, Sir Otto Frankel, F.R.S., F.A.A., Professor J.G. Hawkes, Professor J.R. Harlan and Dr. M.S. Swaminathan and especially to the editor, Miss Erna Bennett, for their efforts, contributions and constant care in the production of this important publication.

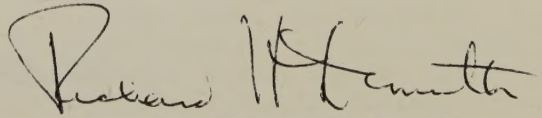
Whereas in the past the Newsletter contained mostly scientific papers and reports, the creation of IBPGR has accelerated genetic resources work which has in itself necessitated a change in its style and format. We are happy to present the first issue of the revised version with review articles, notes and information on current activities. Through this media it is hoped to stimulate greater interest and knowledge of the emerging global network of genetic resources activities which is now becoming a reality.

The objectives of the IBPGR are directed to safeguard plant genetic resources that might be exhausted through the introduction of newly bred varieties and hybrids, but it is equally important that such resources are immediately available to breeders all over the world to be used with all possible advantages in their breeding work. Prompt, concise information in the Newsletter is designed to advance this objective.

This Newsletter, aimed at keeping readers informed and up-to-date, is sponsored jointly by FAO and IBPGR. It is the responsibility of the Crop Ecology and Genetic Resources Unit of the FAO Plant Production and Protection Division which provides the Secretariat of the IBPGR and ensures that the work of each organization complements and supplements the other.



Dieter F.R. Bommer
Assistant Director-General
Agriculture Department, FAO



Richard H. Demuth
Chairman
International Board for Plant Genetic Resources

IBPGR PLANS FOR CROP COLLECTING

IN 1976 IBPGR PUBLISHED A BOOKLET OUTLINING ITS PRIORITIES FOR ACTION ON SPECIFIC CROPS AND REGIONS OF THE WORLD. THE AIM WAS TO SELECT INDIVIDUAL SPECIES OF GROUPS OF SPECIES, GIVE THEM PRIORITY RATINGS ACCORDING TO CERTAIN CRITERIA, AND THUS TO FOCUS ATTENTION ON COLLECTING WHICH NEEDS TO BE DONE.

The criteria were:

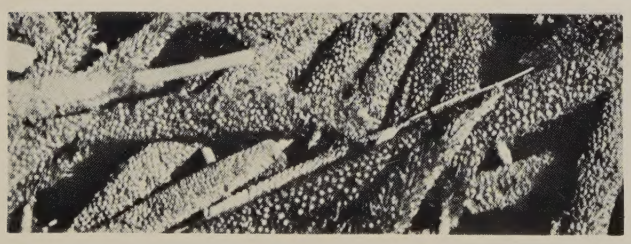
- the risk that genetically diverse materials of the species and their wild relatives will be lost in the future through changes and developments in agriculture and land, and through the introduction of new varieties,

- the economic and social importance of the materials to be collected, measured in terms of their usefulness and importance, as well as their expected or potential contributions to mankind,

- the agreed needs of plant breeders and research workers, in both developing and developed countries, for genetically diverse material,

- the size, scope and quality of existing collections.

At the same time, the IBPGR set up five crop germplasm advisory committees to advise on how genetic resources activities could be implemented on the major crops - wheat, rice, maize, sorghum and millets, and *Phaseolus* beans. These committees are co-sponsored (except in the case of wheat) by the appropriate International Agricultural Centre of the CG. The committees have provided detailed advice to the IBPGR and represent a consensus of opinion of the world community of breeders of the particular crop. All of the committees have met at least once since they were set up, and over the next few pages, the exploration targets for crops which they identified, are outlined. Some brief notes on the recent action to implement these recommendations are given.



SORGHUM & MILLETS

Sorghum

Priority areas for collecting and taxa to be collected:

MOST URGENT

Priority No. 1.	Mali, Niger, Sudan.
Priority No. 2.	Chad, Central African Empire, Tanzania, Malawi, Somalia, Botswana, Zambia, Mozambique.

LESS URGENT

Southeast Asia (a limited amount of collecting is necessary in Burma, Thailand, Malaysia, Indonesia, and the Philippines), China, Southwest Asia (a few good collections are needed from Turkey and North Syria) Yemen Arab Republic and the part of Saudi Arabia adjoining the Yemen border.

The major gaps in sorghum collections (excluding the priority areas listed above, and assessed both taxonomically and geographically) are as follows:

Taxonomically	Geographically
No species other than *S. bicolor*	North Africa, Morocco, Algeria, Tunisia, Libya, Arab Republic of Egypt.
Very few wild races	West Africa, Guinea, Sierra Leone, Ghana, Ivory Coast, Togo, Congo.
Very few shattercanes	Southwest Africa and Angola.
Few cultivated grassy sub-races	East Africa: Somalia, Rhodesia.
Very few kaoliangs	Near East: Syria, Lebanon, Jordan, Iraq, Iran.
Short on some special sub-races (rigidum, membranaceum, decrue and transplanted types)	Afghanistan, West Pakistan.
	Hill country: India, Nepal, Sikkim.
	Southeast Asia: Assam, Burma, Lao, Democratic Kampuchea, Viet Nam.
	Japan, Korea.

Millets

Priority areas for collecting *Pennisetum* millets are:

First priority:	Sudan, Chad, Southwest Africa.
Lower priority:	Ghana, Guinea, Ivory Coast, Tunisia, Algeria, Morocco, Spain, Yemen Arab Republic, Arab Republic of Egypt, Saudi Arabia, Kenya, Uganda, Zaire, Zambia, Tanzania, Malawi, Lesotho, Rhodesia, South Africa, Angola, Mozambique, Pakistan India.

ØORSTOM started work in West Africa in 1975 with funding from UNEP. In 1976, IBPGR assumed responsibility and the work has continued through 1977 and will go on in 1978. Collecting in the Sudan started in 1977 with UNEP/IBPGR funding and will continue in 1978. Plans are going ahead for collecting in Kenya and Tanzania this year. A short report on the Sudan is on p. 27.

WHEAT

The priorities for collecting are: 1. tetraploid, 2. hexaploid, 3. diploid (including *Aegilops*). Nevertheless, these priorities are somewhat empirical because it is recommended that missions should collect whatever is available in the field.

The committee considered the priority ratings of geographical regions for wheat collecting which were drawn up at the Leningrad Symposium and reaffirmed these with some modifications. A finalized list is given below:

Priority 1.

The Near East (from Afghanistan to the Mediterranean) and the Caucasus

Greece

Ethiopia

People's Republic of China

Priority 2.

Tunisia, Algeria, Morocco, Spain and Portugal

Yugoslavia and Albania

South Asian sub-continent (India and Pakistan)

Priority 3.

France and Italy

Northern Europe

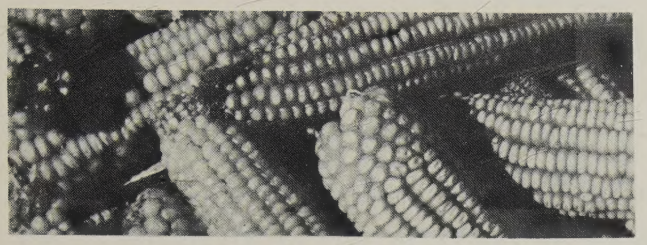
Latin America

Ø During 1977 wheat was collected in Greece, Tunisia, Algeria, Spain, and Portugal as part of the IBPGR Mediterranean programme.

Some collecting has continued as part of the national programmes of the IBPGR's Southwest Asia regional programme and Afghanistan plans to collect in North Badakhshan and Southeast Afghanistan in 1978.

The Genetic Resources Centre in Ethiopia has laid high priority on the collection of wheat.

The Indian authorities are considering the priorities for collection in India. The committee suggested that within the country the first priority should be the rainfed area of Central India, the second priority, the State of Gujurat (chiefly for tetraploid wheat), and the third should be Rajasthan (because of the importance of salinity/alkalinity tolerant germplasm).



MAIZE

Collection plans relate largely to cultivars, but the wild relatives of maize should also be collected during exploration missions. The committee agrees that collections of Teosinte and *Tripsacum* are reasonably complete.

PRIORITIES

HIGH	LOWER
Western Peru	Nepal, Bhutan, Sikkim, Assam
Santa Cruz Plains (Bolivia)	Northeast Brazil
Argentina	People's Republic of China
Spain	Indonesia and the Philippines

Ø Action started in 1977 with collecting taking place in Argentina (Northeast Cordoba, La Rioja, Catamarca, Tucuãman, Jujuy and Salta); Peru (the coastal region) and some work started in Spain and Portugal. We are informed that the Indian authorities have started collecting in the Himalayan Region (see p.25), and the IBPGR will fund some exploration in Brazil in 1978.

PHASEOLUS

Emphasis should be placed on collecting the following species: *Phaseolus vulgaris*, *P. coccineus*, *P. lunatus*, and *P. acutifolius*. Other *Phaseolus* sp. will be considered later but current information does not yet justify their extensive consideration or collection.

Major emphasis in future collections should be:

In the highlands and lowlands of Mexico and Peru for *P. vulgaris* and *P. coccineus*; more comprehensive collections of *P. vulgaris* from Turkey and the Iberian peninsula.

In Peru and Brazil for *P. lunatus*, and possibly also in Guatemala and the Caribbean Islands.

In Argentina, Honduras and Peru and the Galapagos Islands for *P. aborigineus*.

In North Mexico and Arizona for *P. acutifolius*.

Ø CIAT, which has the major responsibility for *Phaseolus* germplasm will keep the priorities under review and initiate action in the priority areas when necessary.

RICE

Efforts should be made to extensively collect in the Asian belt of diversity: North and Northeast India, northern Burma, northern Thailand, and Yunnan Province of China. IRRI will continue its proposed scheme of collection in South and Southeast Asia. Priority should also be given to the collection and conservation of minor cultivars in the undisturbed areas of tropical Asia, the annual weed races, and wild species.

The following details provide the priority areas:

(a) India: In addition to North and Northeast India, Madhya Pradesh, the western part of Orissa bordering M.P., Himachal Pradesh, Konkan district covering Maharashtra and Karnataka, Dangs district in Gujarat, and Adelabad district in Andhra Pradesh.

(b) Nepal and Bhutan: High-elevation areas.

(c) Indonesia

(i) East Lombok ("Dendek" varieties of the bulu type).

(ii) South Sulawesi ("Banda" varieties of the bulu type and "Bakka" varieties of the *indica* type).

(iii) East Java: Jember area, ("Gropak" varieties of the bulu type).

(iv) Bojonegoro and Lamongan areas ("Bronjong" varieties of the *indica* group).

(v) South Sumatra ("Lebak" and "Kwatik" varieties).

(vi) South Kalimantan ("Bayar" varieties).

(vii) Coastal regions of Java, Sumatra, Sulawesi and Kalimantan (Salinity-tolerant varieties).

(viii) Hill regions of Java, South Sumatra and Sulawesi, southern coastal region of Java; island group in Nusa Tenggara; and remote areas in central and eastern Kalimantan, Aceh, Bengkulu and north Lampung.

(d) People's Republic of China: (especially southwest China).

(e) Africa

1. Areas of primary importance:
   (a) Western part of Ivory Coast
   (b) Northwest section of Nigeria
   (c) Guinea

2. Areas of secondary priority are: Niger, Sierra Leone, Mali, Upper Volta, Guinea-Bissau, Senegal, Gambia, Chad, Ghana, Togo and Benin.

Ø A concerted attack has been launched on West African rice (see p.23) and IRRI has continued its central coordinating role for the collection of Asiatic material.

Forage genetic resources in N. Africa, Near and Middle East —

'A SPECIAL AREA OF CONCERN'

Grazing, dryland cultivation and the need for fuel are causing severe genetic erosion of forage plants in North Africa, and the Near and Middle East.

The erosion is so bad that an FAO expert, Mr. M. Kernick, has called it "a special area of concern".

In his report, Mr. Kernick, of FAO's Crop and Grassland Production Service, says that in the past, far too much emphasis has been placed on the introduction of exotic varieties to the region. More work, he says, should be done in surveying and evaluating existing collections of indigenous forage species.

Mr. Kernick makes suggestions as to what should be collected and gives orders of priority for the different species, along with brief outlines of where major collections of forage plant material are held at the moment.

Local genetic erosion is continuing of PALATABLE PERENNIAL WOODY SHRUBS belonging to the Chenopodiaceae and Compositae which are being cut for fuel, e.g. *Artemisia herba-alba*, *Salsosa vermiculata*, *Rhanterium eppaposum*, and *R. suaveolens*. There are many other similar examples in danger not only by cutting for fuel, but from the extension of cultivation into steppe and desert areas. In some cases, local ecotypes have disappeared altogether after the land has been ploughed and where shifting cultivation is practised these are often replaced by ecotypes which are less palatable.

This also applies to PALATABLE PERENNIAL GRASSES in arid and semi-arid regions which are not only in danger of erosion from the rapid extension of dryland cultivation, but in a number of cases are under severe grazing pressure or have even been grazed out in some places, e.g. *Dactylis glomerata*, subsp. *hispanica*, *Danthonia forskhalii*, *Cenchrus ciliaris*, *Chrysopogon aucheri*, *Cymbopogon schoenanthus* spp. *laniger*, *Lasiurus hirsutus*, *Panicum antidotale* and *Tricholaena teneriffe* while an example of a not very palatable grass is *Stipa tenacissima* which is being harvested on a considerable scale for paper making in North Africa. In the semi-arid/semi-humid mountain regions, genetic erosion of forage species is likely to be more local, but the loss of local ecotypes may well occur in specific areas where heavy grazing pressure exists. Perennial grass and legume species of *Bromus*, *Dactylis*, *Hedysarum*, *Phalaris*, *Trifolium* and *Trigonella* are likely to be particularly affected.

ANNUAL FORAGE SPECIES throughout the region are likely to be less susceptible to genetic erosion than perennials since they are generally prolific seed producers and have a short growing season, surviving severe drought as dormant seeds.

Species which should be collected for immediate use in farm systems include:

(a) annual : *Lathyrus*, *Lolium*, *Medicago*, *Trifolium* and *Vicia* spp. for inclusion in dryland cereal rotations in semi-arid areas with 300-500 mm annual rainfall, *Scorpiurus* spp. could also prove important but have been little studied so far.

(b) short-lived (2-3 years) grasses including such species as *Astragalus siliquosus*, *Hedysarum coronarium*, *Lolium multiflorum*, *Secale montanum* and *Onobrychis viciifolia* for inclusion in longer term dryland crop rotations in areas with at least 500 mm annual rainfall.

(c) perennial grasses and legumes such as *Dactylis glomerata* subsp. *hispanica*, *Festuca arundinacea*, *Medicago sativa*, *Oryzopsis holciformis*, *O. milacea*, *Phalaris truncata* and *Trifolium fragiferum*

for re-seeding depleted grasslands in high plateaux and littoral areas of the region with mild winters and an annual rainfall at or above 450 mm.

(d) perennial grasses, legumes and shrubs such as *Agropyron desertorum, A. elongatum, A. intermedium, Bromus tomentellus, Kochia prostrata, Medicago sativa* and *Secale montanum* for re-seeding depleted grasslands in steppic and sub-steppic areas of the region with cold winters and 250-300 mm annual rainfall.

(e) perennial grasses and legumes such as *Arrhenatherum elatius, Dactylis glomerata, Phalaris tuberosa, Trifolium ambiguum* and *T. fragiferum* for re-seeding depleted grasslands in mountain areas of the region with at least 500 mm annual rainfall.

The following species may be of interest in stabilizing agriculture in emergency areas, although this is not an exhaustive list:

(a) perennial grasses, legumes, shrubs and trees such as *Acacia cyanophylla, A. cyclops, A. nilotica, A. nilotica* subsp. *indica, Agropyron junceum, Ammophila arenaria, Artemisia manosperma, Arundo donax, Calligonum aridi, C. azel, C. comosum, C. polygonoides, Cenchrus pennisetiformis, C. setigerus, Haloxylon persicum, Lotus creticus, Panicum turgidum, Pennisetum dichotomum, P. orientale, Polygonum equisetiforme, Retama raetam, Saccharum aegyptiacum, S. biflorum aegyptiacum, Stipagrostis pennata, S. pungens* and *Ziziphus spina-christi, Z. nummularia* for reclamation of sandy wadis and sand dune fixation in steppe and desert areas of the region with 150-200 mm annual rainfall.

(b) perennial grasses, legumes and shrubs such as *Aeluropus littoralis, A. repens, Atriplex glauca, A. leucaclada, A. verruciferum, Camphorosma perenae, Cynodon dactylon, Elymus triccoides, Haloxylon aphyllum, H. articulatum, Hedysarum carnosum, Lotus tenuis, Puccinellia distans, P. distans* subsp. *eu-distans, Sporobolus marginatus* and *S. spicatus* for the reclamation and improvement of saline desert areas in the region with 150-250 mm annual rainfall.

There are several known existing collections of germplasm and some need to be surveyed. The following represent a brief, but not comprehensive list.

Within the Near and Middle East region itself, the most notable collection of indigenous forage species exists at the Agricultural Research and Introduction Centre at Izmir in Turkey, where more than 3 000 accessions of forage grasses and legumes were assembled from the different climatic regions of the country during 1966-1973. A considerable collection of indigenous *Medicago sativa, Onobrychis sativa* and *Secale montanum* is also being maintained at the Grassland and Forage Crop Research Institute near Ankara.

Meanwhile, in Iran there are some 400 accessions of indigenous grasses legumes, herbs and shrubs, collected during the life of the FAO Pasture and Fodder Crops Project and now maintained and evaluated by the Range Organization of the Ministry of Natural Resources in nurseries at Karadj and Hamand, near Teheran.

In Israel, at the Volcani Research Institute, Bet Dagan, there are sizeable collections of annual legumes belonging chiefly to the genera *Medicago* and *Vicia*, as well as smaller collections of perennial grasses, in particular, *Phalaris* and *Oryzopsis*. The Soil Conservation Division of the Ministry of Agriculture at Haifa is also giving emphasis to the collection and conservation of desert and sand binding plants, and a sizeable collection of perennial desert grasses and shrubs has been built up.

In North Africa, there is a large collection of indigenous annual *Medicago* spp. (about 850 accessions) collected by CIMMYT in Algeria and maintained in nurseries at Tessala and Saida near Algiers. The Institut National de Recherches Forestières near Tunis, Tunisia, has a good collection of indigenous and introduced *Atriplex* and *Opuntia*, and planting material has been exchanged with other countries in the region. Finally, in Morocco at the Institut de Recherche Agronomique at Rabat, there are collections of both temperate and sub-tropical grasses and legumes, and improved varieties of *Chloris gayana, Dactylis glomerata, Festuca arundinacea* and *Phalaris tuberosa* have been developed.

Outside the region there are many relevant collections.

A very large collection of grasses and legumes, chiefly belonging to the genera *Dactylis*, *Lolium*, *Medicago*, *Phalaris*, *Trifolium* and *Vicia*, much of it collected in North Africa, the Near and Middle East, is maintained by the CSIRO at Canberra. From these collections, improved varieties have been developed for *Dactylis glomerata*, *D. glomerata* spp. *hispanica*, *Lolium rigidum*, *Medicago trunculata*, *M. littoralis*, *Trifolium cherlei*, *T. hirtum*, *T. subterraneum*, and these varieties are now being reintroduced and evaluated in a number of countries in North Africa and the Near East.

A collection of some 330 accessions of arid zone and salt tolerant grasses, legumes and shrubs, many of them collected in Algeria, Iraq and Iran, is being maintained by the Soils Division of the Department of Agriculture, Perth, West Australia.

In the USA and Canada, large collections of temperate grasses and legume species, including material also collected in North Africa and/or the Near and Middle East, is maintained at research institutions listed in the FAO Plant Introduction Newsletter 6, 1959.

In the USA, sizeable collections of indigenous shrubs, including many *Atriplex* spp. are maintained by the USDA Research Service and Inter-mountain State Forest Research Service. A number of these species has been introduced and evaluated in North Africa, the Near and Middle East.

At the Central Arid Zone Research Institute, Jodhpur, India, a collection of arid zone grasses and legumes is being maintained and improved varieties or strains of *Cenchrus ciliaris*, *C. setigerus*, *Cyamopsis tetragonoloba*, *Lasiurus sinducus*, *Phaseolus aconitifolius* and *Panicum antidotale* have been developed. Attention has also been given to the collection of germplasm of fodder trees and shrubs. Sizeable collections of temperate and sub-tropical grasses and legumes are also maintained at the Indian Agricultural Research Institute, New Delhi, and a considerable number of improved and hybrid varieties have been developed in recent years.

Dryland agriculture in Algeria (Photo by P. Perrino)

Conclusion

At the present time there is a need to survey and further evaluate existing collections of indigenous forage species in North Africa, the Near and Middle East. In the past, rather too much reliance has been placed on the introduction and testing of exotic varieties, which, in some cases, are not as well adapted as the germplasm in existing indigenous collections. Much more collection and evaluation should be carried out within the region itself. Little has so far been done to exploit the valuable arid zone forage plants in the region which have potential for the steppe and desert areas with less than 200 mm annual rainfall.

This is a special area of concern for FAO and UNEP's joint EMASAR (Ecological Management of Arid and Semi-arid Rangelands in Africa, the Near and Middle East) programme since there is a priority need to develop indigenous forage plants that can assist the stabilization of agriculture in emergency areas and help to halt the process of desertification.

M. KERNICK

Résumé

Le pâturage, la culture des terres arides et les besoins de combustible sont à l'origine d'un grave appauvrissement des ressources génétiques des plantes fourragères d'Afrique du Nord, du Proche- et du Moyen-Orient. L'auteur, M. Kernick, du service FAO de la production végétale, demande qu'on travaille plus activement à inventorier et évaluer les collections existantes d'espèces fourragères indigènes. Il suggère les espèces à récolter et indique des espèces à considérer comme prioritaires. Il donne la liste des collections existantes.

Resumen

El pastoreo, los cultivos de secano y la necesidad de leña están provocando una grave erosión genética de plantas forrajeras en Africa del norte y el Cercano y Medio Oriente. En el artículo, el Sr. M. Kernick, del Servicio de Producción de Cultivos de la FAO, indica que deberán realizarse más trabajos de reconocimiento y evaluación de las colecciones existentes de especies forrajeras indígenas. Se hacen sugerencias acerca de qué especies deberán coleccionarse y se señalan prioridades para la acción en relación con especies. importantes. Se enumeran las colecciones que existen actualmente.

FIRST PRIORITY LIST

(Grasses and Legumes)

Species	Use
1. *Medicago littoralis*	For forage production in dryland cereal rotations with 250-400 mm annual rainfall.
2. *M. rugosa*	
3. *M. scutellata*	
4. *M. trunculata*	
5. *Lathyrus sativus*	
6. *Vicia ervilea*	
7. *Dactylis hispanica*	For reseeding depleted grasslands to provide grazing in areas with 250-350 mm annual rainfall.
8. *Orypzopsis holciformis*	
9. *M. sativa*	
10. *Cenchrus ciliaris*	For reseeding depleted grasslands to provide grazing in areas with 200-250 mm annual rainfall.
11. *Lasiurus hirsutus*	For reseeding depleted grasslands to provide grazing and for fixing sand dunes in areas with 100-200 mm annual rainfall.
12. *Panicum turgidum*	

SECOND PRIORITY LIST

(Grasses and Legumes)

1. *Medicago orbicularis*	For forage production in dryland cereal rotations in areas with 250-400 mm annual rainfall.
2. *M. polymorpha*	
3. *M. turbinata*	
4. *Scorpiurus sulcatus*	
5. *Trifolium cherlei*	
6. *Vicia villosa*	

SECOND PRIORITY LIST

(Grasses and Legumes) cont'd.

7.	*Bromus tomentellus*	For reseeding depleted grasslands for grazing in areas with 250-350 mm annual rainfall.
8.	*Chrysopogon gryllus*	
9.	*Secale montanum*	
10.	*Stipa barbata*	For reseeding depleted grasslands for grazing in areas with 150-250 mm annual rainfall.
11.	*Cynodon dactylon*	For reseeding on saline flats to increase forage production in areas with 200-400 mm annual rainfall.
12.	*Puccinellia capillaris*	

THIRD PRIORITY LIST

(Herbs, Shrubs and Fodder Trees)

1.	*Acacia raddiana*	For planting as browse and fodder reserves in depleted grasslands in areas with 200-400 mm annual rainfall.
2.	*Artemisia herba-alba*	
3.	*Atriplex halimus*	
4.	*Kochia prostrata*	
5.	*Poterium lasiocarpum*	
6.	*Salsola rigida*	
7.	*Taraxacum officinale*	
8.	*Ziziphus nummularia*	

Bananas, Plantains & the Future

A MAJOR NEW COLLECTION OF BANANA GERMPLASM IS BEING SET UP AT DAVAO IN THE PHILIPPINES TO SERVE BOTH THE PHILIPPINES NATIONAL PROGRAMME AND THE IBPGR'S SOUTHEAST ASIAN PROGRAMME.

Initially, it will be the biggest collection in Southeast Asia but it could eventually become the major international collection.

The decision to establish this new centre was taken at a meeting of an IBPGR Working Group on the Genetic Resources of Bananas and Plantains last year. The Group met to consider a world programme for genetic conservation and agreed that one was needed for three reasons:

(i) because it is a major food crop as well as an export crop,

(ii) because the crop could play a major role in future rural development,

(iii) because there is evidence of widespread loss of cultivars in the centre of diversity and the variability of some of the wild species of interest is threatened by shifting cultivation and forest clearance.

The Group agreed that as far as possible a programme for collection and conservation should be linked to active breeding programmes. It was, they said, important to complete and conserve collections while the variability is still available.

Five really important collections of banana germplasm exist in the world at the moment. These are in Honduras, Jamaica, the Philippines, Papua New Guinea and India.

There is, however, a wide gap in these collections because they contain very little *Musa acuminata* material. This species, said the Group, is of primary importance for banana breeding and further collections were recommended. In addition, they said that as "a matter of some urgency" exploration and collecting should take place in Burma, Indo-China (Viet Nam, Lao and Democratic Kampuchea), Thailand and Indonesia.

All local collections should ultimately be taken to the Philippines and eventually be duplicated for safety in the New World.

The Philippines was chosen as the new major collection because of the willingness of the Government and also because the site satisfied five criteria laid down by the Group. These criteria were:

(a) political stability,

(b) the absence of major environmental hazards,

(c) the low incidence of Panama disease and Bunchy top,

(d) good local and international communications,

(e) the availability of a technically competent organization to provide management and control.

● A table listing the five important world collections and their holdings is shown overleaf.

	Total Holding				
	Cultivars	Wild	Duplication	Date Collection Made	Freely Available
Honduras (United Fruit Co.)	470	100	No	1959-61	Yes
India (Coimbatore)	48	3	No	1949 to date	Yes
Jamaica (Banana Board)	80	40	No	1920's to date	At present No, but request has been made
Papua New Guinea (Lae)	Total ca 700 but probably only 100 distinct		No	1969-72	Yes
Philippines (Los Bãnos)	68	1	Planned at Davao	1958-59	Yes

Résumé

Un groupe de travail du Bureau International des Ressources Génétiques Végétales, qui s'est réuni l'an dernier, a marqué un progrès considérable dans la voie d'un programme international de conservation des ressources génétiques de bananes et plantains et a formulé les recommandations suivantes: (a) qu'une collection importante soit installée aux Philippines; (b) qu'on fasse des collections de *Musa acuminata* en particulier en Birmanie, en Indochine, en Thailande et en Indonésie.

Resumen

El Grupo de Trabajo del IBPGR que se reunió el año pasado dió un paso importante para la realización de un programa internacional de conservación genética del banano y el plátano, y recomendó: (a) que Filipina hospede una colección importante; y (b) que se coleccione *Musa acuminata*, en particular de Birmania, Indochina, Tailandia e Indonesia.

Realizing there were large gaps in the world collection of groundnut germplasm, Dr Walton C. Gregory and Prof. A. Krapovickas organized three exploration missions in South America over an eight-month period in 1976-77. Dr Gregory of North Carolina State University, Raleigh, is one of the world's experts on groundnuts and Prof. Krapovickas is an acknowledged authority on the taxonomy of groundnut species. Here is an abstract of Dr Gregory's report:

GROUNDNUTS: FILLING THE GAPS

Earlier explorations for *Arachis* germplasm had recovered only a few isolated specimens from the highly important area lying between the Andes, north of the tropics and west of longitude 56°W on the eastern edge of the Gran Pantanal. The missions reported below were funded by the IBPGR, were designed to remedy this deficiency and were developed in three phases:

1. Exploration of the Gran Pantanal in western Mato Grosso, Brazil, during December 1976.

2. Exploration of an arc extending from near the 24th parallel at Salta, Argentina, northward and eastward along the interface of the eastern cordillera and the Gran Chaco from Salta to Santa Cruz de la Sierra, Bolivia; from there, north and east along or near the continental divide towards the western edge of the Pantanal to San Ignacio below the 16th parallel and west from Santa Cruz to Cochabamba and South Yungas (March-May, 1977).

3. Exploration in Paraguay through to the southern Pantanal (June-July 1977).

The map overleaf shows where the collections were made. These were from 251 localities, 125 were for wild species and 126 were for cultivated strains. *Rhizobia* nodules were collected in each locality.

December was chosen for the exploration of the Gran Pantanal because it is the month when the water of the Pantanal is, on average, at its lowest point, and because it is early summer there in December and *Arachis* is then in full bloom, thus making conspicuous plants which are otherwise difficult to find. More than 800 living plant specimens and representative herbarium material of wild *Arachis* species were collected in about 40 localities along the perimeter of the Gran Pantanal, Mato Grosso, during the period 1-20 December 1976. Collections extended from Porto Indio, north of Lagoa Gaiba, in the west, to Corumba through the southern end of the Pantanal to Campo Grande on the east, north to Cuiabã and west to Caceres. The living specimens collected were more or less equally divided into three portions and sent to the Instituto Agronomico, Campinas, São Paulo, Brazil; Centro de Gado do Corte, Empresa Brasiliera de Pesquisa Agropecuaria (EMBRAPA), Campo Grande, Mato Grosso, Brazil; and to the Department of Botany and Ecology, National University of the Northeast, Corrientes, Argentina.

In March, April and May 1977, 43 collections of wild species, nine in northwest Argentina, and 34 in Bolivia, were made. During this same period, 118 collections of the cultivated species *A. hypogaea*, were recovered from markets and farms. Nearly all of these samples, both wild and cultivated, were collected as seeds. From 15 June to 7 July 1977, 47 collections of wild species (mostly as plants) and eight additional cultivated forms were made. Thirteen seed collections were made from plants placed in Campinas, São Paulo, Brazil, in December 1976. The living plant specimens of the respective countries were deposited at Campinas, São Paulo, Brazil; Corrientes, CTES, Argentina; Santa Cruz, Bolivia. Seeds were distributed to Argentina, Bolivia and the USA. Departure from Paraguay through the northern border prevented deposit in that country. *Rhizobia* were sent to the USA. Herb-

Map showing areas of collection

arium material of wild *Arachis* was deposited in Corrientes, CTES, Argentina, from where duplicates will be distributed to herbaria in customary fashion.

In conjunction with the IBPGR more work is planned in 1978. Dr Gregory says that Krapovickas is of the opinion that an expedition in 1976 to the northwest of Argentina and Bolivia should look for annual tetraploids as well as *A. monticola* and native races of *A. hypogaea* (particularly in the southern region of Bolivia), types exposed to genetic erosion. A second priority for further action would be exploration for Peruvian groundnuts followed afterwards by exploration of the region of Serra dos Parecis in Mato Grosso, and Rondonia to look for *A. villosulicarpa* and other *Arachis* spp.

Groundnuts from their centre of diversity, South America

Résumé

En 1977, le Bureau International des Ressources Génétiques Végétales a fourni des crédits pour collectionner des souches génétiques d'arachides en Amérique du Sud. Ce travail, organisé par M. Walton C. Gregory (Etas-Unis) et M. A. Krapovickas (Argentine), a été réalisé en trois étapes. Le rapport donne la liste des zones prospectées et indique où les échantillons ont été déposés.

Resumen

En 1977, el IBPGR facilitó fondos para la recolección de plasma germinal del maní en Sudamérica. El Dr. Walton C. Gregory (EE.UU.) y el Prof. A. Krapovickas (Argentina) organizaron el trabajo, que se realizó en tres fases. En el informe se enumeran las áreas que se han explorado y donde se han depositado muestras.

USA CO-ORDINATES ITS

WORK BEGINS THIS YEAR ON SETTING UP A SERIES OF FRUIT AND NUT GERMPLASM REPOSITORIES THROUGHOUT THE USA.

This important project which will be linked to any future international germplasm repository system for such crops, is the work of the US National Plant Germplasm Committee in conjunction with national agricultural and research organizations.

Twelve repositories are planned and they will cover a wide range of fruits and nuts, along with coffee and cocoa. The main aim of the system will be to store valuable fruit and nut germplasm and make it readily available to plant breeders and other plant scientists. The map opposite shows where all the repositories will be.

The repositories are being stationed at places where research facilities of State Agricultural Experiment Stations of the Agriculture Research Service already exist, with funds coming from both organizations.

The repositories will be closely associated with the Regional Plant Introduction stations and will be under the regulations of the Animal and Plant Health Inspection Service. This is to ensure that germplasm brought into the country from outside is disease and pest-free and that everything possible is done to keep it that way.

This development will act as an important part of the international network of centres. The IBPGR has not yet decided upon the global priorities for fruits and nuts, since so far, it has laid emphasis on major crop plants. However, coffee, cocoa and bananas have been designated, and the Working Group which set up the IBPGR Regional Cooperative Programme for Southeast Asia has agreed that some tropical fruits should be made priorities for action in the region.

The organizers also hope to include accessions of germplasm from other parts of the world, evaluate it and encourage appropriate research thereon.

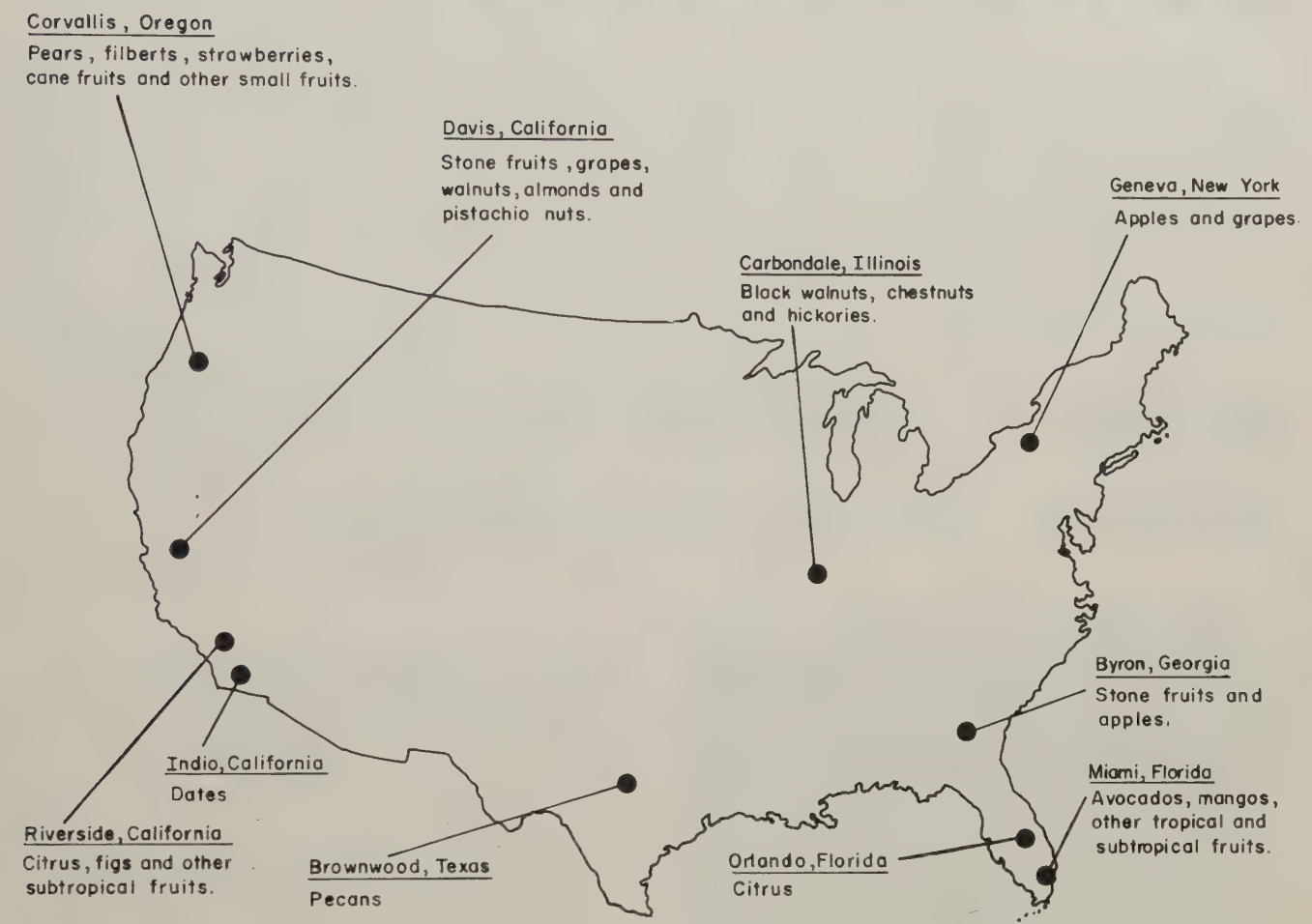
Each repository is to be looked after by a Curator. He will have a series of responsibilities including maintenance, evaluation, preparing publications, keeping down viruses and pests, and preparing the annual budget.

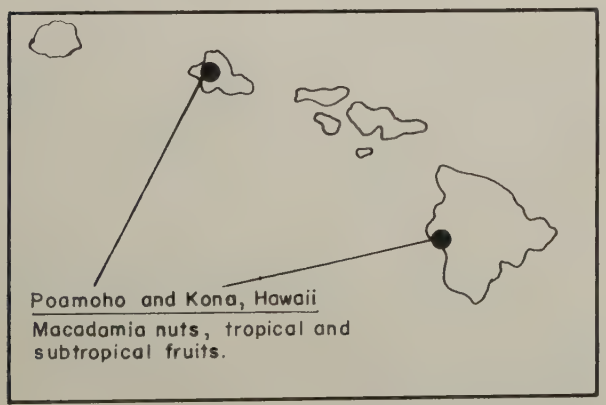
The Curator will also receive advice from one or more of the seven technical Advisory Committees which are being set up. These committees will cover one of seven groups of crops: pome fruits, stone fruits, small fruits, grapes, citrus, sub-tropical and tropical fruits, and nut crops. The committees will be responsible for establishing priorities, reviewing work at the repositories, deciding what germplasm will be maintained, commenting on the annual budgets, and preparing annual reports.

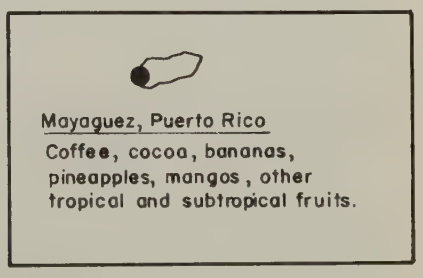
To coordinate all these Advisory Committees, a National Fruit and Nut Germplasm Repositories Sub-committee is being established. It will be made up of the chairmen of the Technical Advisory Committees, the four Regional Plant Introduction Coordinators, advisors from the Cooperative State Research Service, the Agricultural Research Service and the State Agricultural Experiment Stations, and a representative of the Animal and Plant Health Inspection Service.

The Sub-committee will have the responsibility of working out a broad policy for operating the repositories, liaise with Federal and State regulatory agencies, review annual budgets of the Advisory Committees, prepare an annual report, and in general represent the Natonal Plant Germplasm Committee on all matters relating to the establishment and operation of the repositories.

FRUIT, NUT AND COFFEE COLLECTIONS







Résumé

Aux Etats-Unis, le Comité national des ressources génétiques végétales a mis en place un réseau coordonné de grandes collections de fruits et noix, conjointement avec des organismes d'agriculture et de recherche. L'article donne la liste des centres de conservation proposés et décrit l'organisation prévue pour en coordonner les activités.

Resumen

El Comité Nacional de Plasma Germinal Vegetal de Estados Unidos ha establecido una red coordinada de colecciones principales de frutas y nueces, en cooperación con organismos agrícolas y de investigación. Se indican los doce depósitos que se proponen y se expone la estructura administrativa para su coordinación.

Breeders decide to coordinate germplasm activities

NEW COMMITTEE FOR ASIA AND OCEANIA

SABRAO, THE SOCIETY FOR THE ADVANCEMENT OF BREEDING RESEARCHES IN ASIA AND OCEANIA, HAS SET UP A PLANT GENETIC RESOURCES COMMITTEE AS A RESULT OF A WORKING GROUP MEETING IN CANBERRA, FEBRUARY 1977, WHICH MET PRIOR TO THE THIRD CONGRESS OF SABRAO.

It will be known as the SABRAO Committee for Plant Genetic Resources and the Chairman will be Sir Otto Frankel, a Vice-President of the Society.

The working group meeting was attended by about 25 scientists from 12 countries and representatives of several international organizations or centres - BIOTROP, AVRDC, ICRISAT, IRRI and EUCARPIA.

Discussions covered progress reports from countries in the SABRAO region and position papers on germplasm of rice, pulses, sorghum, wheat, soybean, winged bean, fruits, vegetables, sugarcane and forest species.

Much of the discussion was devoted to the outcome of a working group on plant genetic resources in Southeast Asia, held under the auspices of the IBPGR and the Philippine Council for Agriculture and Resources Research (PCARR) at Manila, in December 1976.

The SABRAO Working Group warmly welcomed the agreement reached at the Philippines meeting, which included decisions on crop priorities related to crop diversity, the threat to germplasm; exploration targets; collaboration, and the forming of a regional committee of IBPGR.

It felt, however, that SABRAO still had a major role to play in stimulating activities and providing liaison and information for genetic resources workers in the much wider region of SABRAO.

The Board of SABRAO approved the Working Group's recommendations and along with Sir Otto Frankel, the Committee will consist of Dr. T.T. Chang (IRRI); Dr. K.H. Jain (India); Dr. E.Q. Javier (Philippines); Dr. K.L. Mehra (India); Dr. Setijati Sastrapradja (Indonesia); Dr. Muneo Iizuka (Japan); and Mr. N. Rajanaidu (Malaysia).

COLLECTING AFRICAN RICE

COLLECTING AND CONSERVING GERMPLASM OF *O. glaberrima*, THE INDIGENOUS AFRICAN RICE, HAS BEEN A TOP PRIORITY FOR SOME TIME.

In 1974, a team from IRAT/ORSTOM began a study on the genetic variability of the species and its wild relatives in Africa, and more recently a meeting was held in Paris (25-26 January 1977) jointly organized by IRAT and ORSTOM, as a direct result of the interest shown by the International Rice Research Institute (IRRI), the International Institute for Tropical Agriculture (IITA), the West African Rice Development Association (WARDA), FAO and IBPGR. This was followed by another meeting at Ibadan, Nigeria.

The meetings agreed that WARDA, IRAT/ORSTOM and IITA were organizations of an international character in West africa and so were well placed to take responsibility. It was also agreed that IRRI should be integrated into a proposed conservation programme to make maximum use of its wide experience and expertise.

The meeting further decided that IRAT/ORSTOM should play a major role in francophone Africa - and would collaborate with IITA/IRRI in exploration and evaluation wherever possible. IITA would assume responsibility for anglophone Africa. Moreover, because IITA is using the EXIR system for computerization and documentation of all the collections held by its Germplasm Collection Unit, it was agreed that the documentation of samples would be part of its activities.

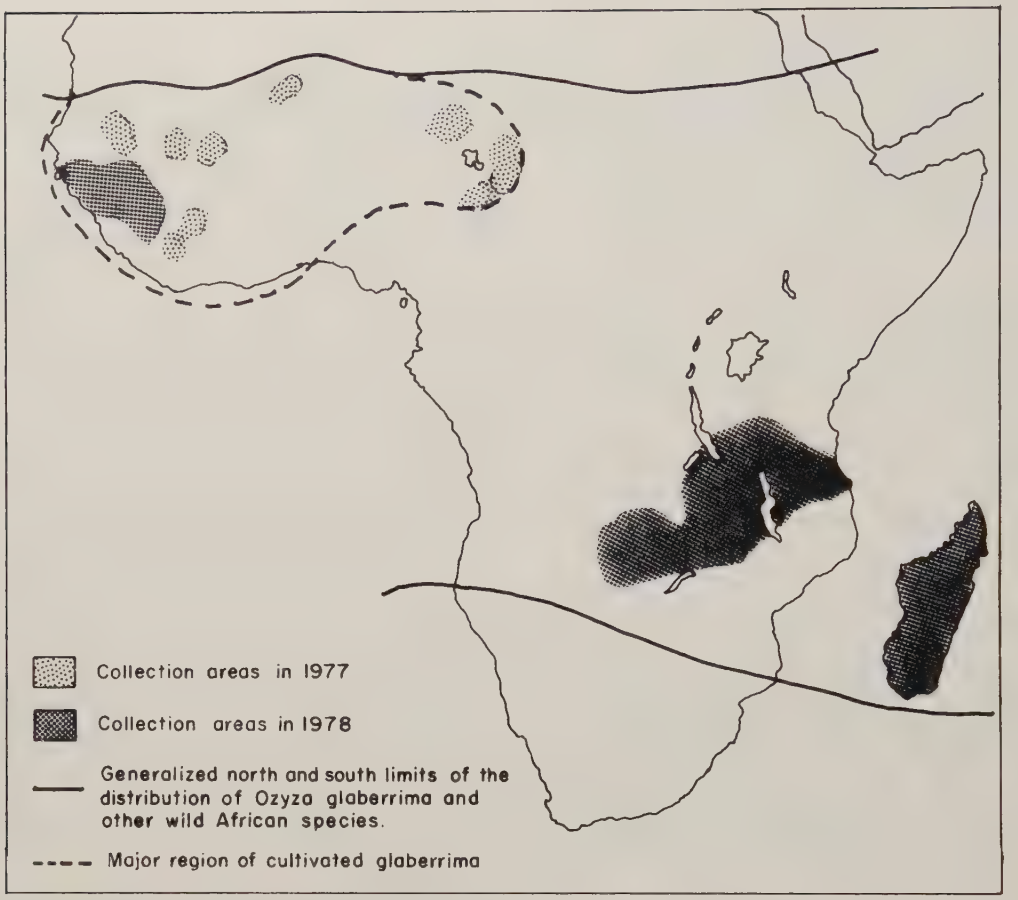
The Paris meeting determined the priority areas for collection in relation to the centres of diversity of the African cultivars and its related wild species. The Asiatic rice *O. sativa*, has long been introduced into Africa and there are many locally adapted rices showing genetic variation. These are to be collected as well as the African rice species. Rice is grown chiefly during the rainy season and during the dry season under irrigation. In some West African centres farmers grow very earlymaturing upland types as a catch crop and medium maturing upland types for the main crop. The diversity covers a wide range of ecosystems from deep water swamps to rain-fed uplands.

During 1977, IRAT/ORSTOM began collecting rice germplasm in the region around Lake Chad, the Senegal river basin, Mali, and the Ivory Coast, with financing provided by ORSTOM, IRAT, IITA, IRRI and IBPGR. At the same time, IITA also collected rice during its collecting missions for a range of crops in Upper Volta, Mali, and the Ivory Coast (October and November 1977) but not in the areas which had already been visited by IRAT/ORSTOM scientists. 1977 therefore, saw the first concerted attack on this priority crop and IBPGR has agreed to fully support IRAT/ORSTOM in 1978 to collect in the region of Guinea and Guinea Bissau, and in East Africa, Tanzania, Zambia and the Malagasy Republic. Details of the collection areas are shown in the map overleaf.

A full report on the Paris meeting can be obtained from IRAT at:

110 rue de l'Université
75007 Paris
FRANCE.

African rice in typical swamp conditions


Collection areas in 1977
Collection areas in 1978
Generalized north and south limits of the distribution of Ozyza glaberrima and other wild African species.
Major region of cultivated glaberrima

At the end of 1977, the major holdings of West African rice (i.e. glaberrimas and their relatives) were at IRRI in the Philippines, (2 238 accessions); IRAT, Paris (1 575 accessions); IITA, Nigeria (820 accessions); and the National Institute of Genetics, Japan, (420 accessions).

Résumé

Compte-rendu des activités récentes sur les ressources génétiques de riz africain. Une réunion tenue en janvier 1977 à Paris a déterminé les zones dans lesquelles des collectes doivent être organisées en priorité en fonction des centres de diversité des espèces africaines et a réparti les responsabilités entre les organisations internationales. Une attaque concertée sur le travail de collecte a été lancée en 1977 et se poursuit en 1978.

Resumen

Se informa sobre actividades realizadas recientemente en materia de recursos genéticos del arroz africano. En una reunión celebrada en París en enero de 1977 se determinaron áreas prioritarias para la recogida en relación con los centros de diversidad de las especies africanas, y se distribuyeron las responsabilidades entre organismos de carácter internacional. En 1977 se emprendió de forma concertada la labor de recolección que se proseguirá en 1978.

J.T. Williams

MORE NEWS ABOUT CROPS

Himalayan Maize Germplasm

It has long been known that the North-east Himalayan states of India have considerable genetic diversity of maize. In the 1960's Dhawan and Thapa collected maize varieties morphologically resembling the hypothetical progenitor of maize described by Mangelsforf and co-workers. The Indian Maize collection, sponsored by the Indian Agricultural Research Institute, New Delhi, maintains a large collection including 1 571 local maize cultivars recently collected from the Himalayan region. This material comes from Assam, Meghalya, Mizoram, Tripura, Nagaland, Manipur, Arunachal Pradesh, Sikkim, Bhutan, and the Chamba Valley in Himachal Pradesh.

Following the collection of the material, an attempt has been made to classify the races by using a modified scatter diagram technique in which several stable characters showing significant variations were used. The material has been classified into 15 races and three sub-races and fully described in a monograph recently published by the Indian Council of Agricultural Research.

The races have been grouped for convenience into four categories: primitive, advanced or derived, recent introductions and hybrid races.

It should be stressed that some of the races are very primitive and some possibly have counterparts in the American continent. Altogether 305 names of the races are listed in the 11 treatises on maize in the western hemisphere. Each treatise relates to one country and some duplication between the races of one country and those of others is to be expected.

To establish the relationships, additional data for adaptation to altitude, maturity, plant colour, pilosity and kernel characters are necessary.

An attempt has been made to look for resemblances between the Indian races and the American races. A case in hand is the close resemblance of the Indian race Khasi Riewhadem with the Montana of Colombia. Both are adapted to high elevations (above 1 500 m) and have tall plants; low venation index; long and thick ears, tapering slightly from base to tip; shank very long, thick and hard; kernels wide and thick; endosperm flinty; white or yellow; aleurone colour lacking; pericarp colour lacking and rachis tissues spongy.

It is significant to note that Montana is the largest-eared race in Colombia and is the counterpart of the Guatemalan-Mexican race Oloton, which is the progenitor of the highly evolved Mexican race Jala. Further, the races Jala and Khasi Riewhadem belong to the same genealogy, Confite Morocho.

The Indian Biaki shows a marked resemblance to the Peruvian race Kculli. Biaki is a recent collection and resembles other Indian races, e.g. Shyam Nahom. Shyam Nahom and Khasi Riewhadem belong to the advanced and hybrid race groups respectively. Such findings suggest that counterparts exist not only for the primitive races, but also for the advanced (or even hybrid) races in India.

B. SINGH, IARI

Forage Legumes in Libya

PLANS ARE GOING AHEAD THIS SPRING TO START A COLLECTION OF ECOTYPES OF INDIGENOUS SPECIES OF FORAGE LEGUMES IN LIBYA. THIS FOLLOWS A MEETING OF INTERESTED PARTIES LAST NOVEMBER AT THE AGRICULTURAL RESEARCH CENTRE, TRIPOLI.

The meeting decided that the collecting would concentrate on annual species of *Medicago* and that as many groups as possible would be brought in to make it a nation-wide effort and establish it as a reference collection for Libya. Proposed work will be an important link in the IBPGR's activities in the Mediterranean basin.

The Agricultural Research Centre, it was agreed, would act a coordinator. The meeting decided that the project should span two or three years involving joint expeditions each year to collect in specific areas over a 10-14 day period. This, it was thought, would help to make the collection as comprehensive as possible and make it unbiased regarding early or late-flowering types.

There was a lot of discussion about whether the collecting should merely concentrate on *Medicago* species or include other useful species (e.g. *Lotus*, *Hippocrepis*, *Hedysarum* etc.) In the end, the meeting agreed to recommend that collecting teams should aim mainly for *Medicago* species, but should collect other species at any site if time permitted.

Main areas to be covered are likely to be: Tripolitana, Cyrenaica and Sirte, with sub-divisions of these to be finalized later. Collecting in some areas may not get under way until next year as the meeting decided that it may be necessary in some parts to conduct a preliminary survey, allowing teams to concentrate on collecting when the time comes. It looks as if ultimately, there will be several teams, half of which will include an experienced collector who will train his assistants.

The object of the exercise will be to help the Jamahiriya region of Libya by increasing the stock of genotypes potentially useful in dry-land farming.

Pulses in the Himalayas

DR. L.J.G. VAN DER MAESEN, GERMPLASM BOTANIST AT ICRISAT, INDIA, LED AN EXPEDITION INTO THE WESTERN HIMALAYAN FOOTHILLS IN OCTOBER 1977.

The expedition had three objectives: to collect *Atylosia* spp. and *Cajanus cajan* in the foothills; to obtain an impression of the distribution and growth of pigeon pea in the hills; and to collect wild relatives of other pulse crops where possible. The eight-day search realized 150 plant specimens with the main emphasis on *Atylosia*, *Rhynchosia* and as it appeared, *Vigna*.

Of particular interest to the group was *A. mollis* and *A. volubilis*, which are so closely related that many botanists believe them to be the same species. However, Dr. van der Maesen found considerable differences. *A. mollis* occurs at higher altitudes only and flowers and fruits after the monsoon but *A. volubilis* has seeds around March.

In addition, *A. volubilis* only reaches seven seeds per pod, whereas *A. mollis* were found to have up to ten seeds. Other differences included leaflet size, shape and indumentum.

The expedition, which went up to a height of 1 500 m, found few pigeon peas except in Garhwal. Only three samples were collected.

Dr. van der Maesen concluded that the area needs to be further explored for pigeon peas and that if time can be found, more entries of each *Atylosia* spp. could be traced.

Sorghum and Millets in Sudan

A progress report:

The first stage of a national programme for collecting sorghum and millet took place in the Sudan towards the end of 1977. The Sudan has long been regarded as an important area of genetic diversity of both sorghum and *Pennisetum* millets, and the two crops are integral to the country's traditional agriculture. Many varieties of the crops still exist, especially in remote areas, mainly because of the poor transport and communications.

However, gradually new varieties are coming in, and transport is becoming easier. Drought has also tended to increase genetic erosion, so it was felt necessary to make collections before some traditional varieties disappeared altogether.

In 1976/77 a national programme for the collection of sorghum and millet germplasm was planned, scheduled to start in November 1977 and end towards the end of 1978. The idea was to concentrate on areas of maximum variability, and was planned in three stages, as follows:

- the first mission took place between November and December 1977 to Central and Western Sudan, and two collecting missions working together covered North and South Kordofan and North and South Darfur.
- the second mission was to Southern Sudan with one team collecting around the Equatoria Province.
- the third mission is due to set off in November this year and will cover Central and Southeastern Sudan. Once again the mission will be split into two teams, one covering Gezira and Kassala; the other covering the White Nile and Blue Nile provinces.

Full reports of the first two missions are not yet to hand but a progress report has been received on the mission to North and South Kordofan which found interesting variations, despite a low sampling frequency.

North and South Kordofan can be divided into two regions; the northern sandy steppes and the more fertile clay plains of Southern Kordofan, including the Nuba mountains. The most important variation found within both sorghum and millets were: drought tolerance, early maturity, disease-resistance and high yields on infertile soils. Within sorghum the main variations were: bird resistance due to unpalatable grain or inaccessible 'dura' type head; its multiple use as a food, in the preparation of beer, in the chewing of the sweet stems, and its fast maturity - between 70 and 80 days.

Millets were collected with bird resistance due to heavy head bristles.

In total, 142 samples of sorghum and 34 samples of millet were collected by 18 December 1977. The progress report suggests that pests and diseases in the area were relatively common, largely as a result of the lack of knowledge and availability of modern control methods. Common pests were: birds, locusts and grasshoppers, stem borers, and grain borers. Diseases included smut diseases, and downy mildew on millets.

The collecting missions to the Sudan are being organized in conjunction with IBPGR, who are providing genetic resources consultants. The initial phase was supported by UNEP funds.

I.R. DENTON

Collecting in West Africa

Further information on the IBPGR supported collecting in West Africa (see p. 5) can be obtained from two reports issued by ORSTOM in 1977.

1. Prospection des Mils pénicillaires et Sorghos en Afrique de l'Ouest. Campagne, 1976, Niger. 89p.

2. Prospection des Mils pénicillaires et Sorghos en Afrique de l'Ouest. Campagne, 1976, Nigéria et Sénégal. 101p.

Okra in Nigeria

OKRA IS AN IMPORTANT VEGETABLE CROP IN NIGERIA BUT INCIDENCE OF VIRUS ATTACK IS SO FREQUENT THAT OFTEN, MORE THAN 90 PERCENT OF THE PLANTS ARE DESTROYED.

So an important project has been put into operation in Nigeria to improve the genetic variability of the plant, organized by Dr. Prem Nath at the National Horticultural Institute in Ibadan.

Dr. Nath made five tours around the country and found that not only was okra liable to attack by viruses but often the fruit was of poor quality, and planting produced low yields. However, it was the virus, as yet unidentified unfortunately, because of the lack of a virologist on the trip, which wreaked most havoc. In addition, wild types were observed to be endangered.

Dr. Nath reports that evaluation of the collection (which now exceeds 200 samples) at the Institute Farm during June to August 1977, clearly showed the unidentified virus or viruses, along with incidence of *Cercospora*. Dr. Nath said that the mystery virus was very serious, damaging 90 to 100 percent of the plants and that there was a "dire need to develop a virus-resistant strain of okra".

Dr. Nath states that the short-term objectives of the okra improvement programme should be to isolate local strains with more than one attribute of: good fruit quality; high yield; and field tolerance to virus/fungal diseases for the southern, northern and eastern region of Nigeria. The longer-term aims should concentrate on suitable plant types, good bearing habits, good fruit quality, high fruit yield, and resistance to diseases and pests, though there were no serious instances of insect pests during Dr. Nath's observations.

The fungus *Cercospora* also caused between 80 and 100 percent damage where it had occurred.

The fruit-bearing ability of the okra varied. Some started at the 7th to 15th node and others as late as the 35th to 40th node. It was very rare, says Dr. Nath, to see a plant which started fruiting at the 3rd or 4th node and in branching types, many of the plants started fruiting very late both on the main stem and on other branches. Some strains took up to ten months to flower. All this resulted in poor fruiting and, not surprisingly, low yield.

Cassava in Brazil

Professor Nassar of the Universidade Federal de Goiás is working on conservation and evaluation of the genetic resources of cassava, with funding from IDRC.

Between November 1976 and June 1977, wild germplasm was collected and maintained as a living collection in the Instituto de Ciencias Biológicas at Goiania.

Eleven wild species from Goiás state are being evaluated for growth habit, habitat characteristics, tuber formation, HCN and protein content, crossability to cultivated cassava and chromosome behaviour.

This work is part of a broader attempt to obtain detailed information of the 40 or so wild *Manihot* species in Central Brazil and to collect representative diversity.

To date, two samples have proved to have a notable high protein content and some of the wild species screened seem to be adapted to extremely dry habitat conditions. At a later date, screening for resistance will be done especially for reaction to cassava mosaic and bacterial blight.

Barley in Alaska

Dr. B.R. Baum of the Biosystematics Research Institute, Agriculture Canada, Ottawa, took an expedition to West Canada and Alaska during the summer of 1977 to collect material of the *Hordeum jubatum* complex - a wild relative of barley. Seeds will be made available for cytological research and will also be increased for the Canadian gene pool collection.

Winged Bean in Papua New Guinea

An important collection of winged bean *(Psophocarpus tetragonolobus)* took place in the lowlands of Papua New Guinea last March. It was organized by Dr. V. Kesavan and Mr. A. Bala of the Faculty of Agriculture of the University of Papua New Guinea with funds from UNEP administered by FAO's Crop Ecology and Genetic Resources Unit.

The collection was in the Madang area of the East Sepik province of the island and material is being grown for single plant selections and further evaluation. The notable feature of the collection was the identification of long-podded (25-35 cm) types.

Another exploration and collection session was planned for December, but details are not yet to hand.

Winged bean is a priority crop which will continue to receive the attention of the IBPGR's Southeast Asian programme.

Egusi Melons in Nigeria

The Egusi melon *(Citrullus* spp.), grown for its edible seeds which are high in protein and oil, and a popular delicacy cooked with leaf vegetables in Africa, has been collected by the Nigerian National Horticultural Research Institute and five distinct types based on seed characteristics have been identified. These are currently being used in breeding studies to develop higher yielding cultivars and to determine the inheritance of seed types. All forms are cultivars and no wild types have been observed.

Peppers in Brazil

Dr. Cyro Paulino da Costa of the Institute of Genetics at the University of São Paulo, Brazil, has recently made a collection of *Capsicum* peppers from Northeast Brazil. The collection comprises germplasm of three different species.

CIMMYT: caretaker of the world's largest maize collection

A germplasm bank is a service unit for researchers. The bank at CIMMYT collects and stores seed, regenerates seed, tests and catalogues seed, and ships seed to users. The following provides some up-to-date information.

The 13 000 items stored in the CIMMYT bank were gathered from 46 countries, mainly by an agency of the Mexican Ministry of Agriculture during the 1940's and 1950's. Over 90 percent of the collection consists of the species *Zea mays* L. The collection also contains near relatives including *Zea mexicana*, *Zea perennis*, and *Tripsacum* spp.

The bank is held in concrete chambers at a temperature of 0°C and there are over 18 000 labelled storage tins of 2-litre and 4-litre capacity containing 40 tons of seed. The tins are arranged on steel shelving like library stacks. A duplicate seed supply for the CIMMYT collection (500 grammes per item) is currently being deposited for long-term storage at the US National Seed Storage Laboratory.

Fresh seed was grown for over 8 000 bank accessions between 1969 and 1976. In 1977, seed for another 122 highland accessions and 200 tropical-temperate accessions was regenerated in Mexico and added to the bank. In 1977, 500 bank accessions of tropical character were evaluated at two sites (Poza Rica and Tlaltizapan), 500 temperate accessions were evaluated at Tlaltizapan, and over 300 highland accessions at El Batan and Toluca.

genetic resources information and the computer

EVER SINCE THE EARLY DAYS WHEN FAO BEGAN WORK ON PLANT GENETIC RESOURCES THOSE INVOLVED HAVE RECOGNIZED THE NEED FOR AN INTERNATIONALLY ACCEPTED SYSTEM TO RECORD, CLASSIFY, COMMUNICATE, CORRECT AND UPDATE INFORMATION ABOUT ACCESSIONS.

In 1974-75, FAO employed Dr. David J. Rogers to develop a computer-based system - the Genetic Resources Communication, Information and Documentation System (GR/CIDS) following on from earlier computer work on the TAXIR system (Taxonomic Information Retrieval).

Since the establishment of IBPGR it has provided nearly all the funds to develop GR/CIDS through a contract with the University of Colorado at Boulder, USA (the Taximetrics Laboratory - renamed, in 1976, the Information Sciences/Genetic Resources Program).

An information storage and retrieval computer program called EXIR (Executive Information Retrieval) has been developed to meet the specific needs of scientists involved with data management problems. It is a flexible computer program, capable of handling large numbers of descriptive categories. Data can be fed in or extracted as words, numbers of codes, in a variety of ways. The command language can be translated into many languages, so data can be fed into EXIR in any language the user wishes.

Other advantages of the system are that it can handle word data from 1-90 characters; it uses integer, fractional or mixed numbers; input can be in free format; and the feeding in of data can be from a variety of input media - punch cards, disc or tape files, etc. It is designed to accommodate a wide range of data bank sizes and is currently being used by genetic resources centres around the world.

The program has a simple, yet powerful data bank update command, which allows errors to be corrected, data to be updated, and new data to be added, as well as the assignment of new descriptive categories.

It is widely recognized that effective data management is necessary in agricultural research, and building up international data banks relating to important crops would be a boon to genetic resources work. However, most people who have to handle genetic resources information want to do more than just store and retrieve it. It may be necessary to classify it using methods of multivariate analysis, plot data geographically, operate stockholding systems for seed stocks, or other procedures. EXIR produces direct access files which are immediately suitable for use in these additional procedures.

The program has been adapted for mini- and micro-computers, so to find out more about EXIR and its installation, please write to the following address:

Information Sciences/Genetic
Resources Program
1229 University Avenue
University of Colorado
Boulder, Colorado
USA

The IS/GR Program will also provide a list of publications, including the EXIR Brochure, the Data Organization Manual, the Data Preparation Manual and the EXIR User's Manual. The staff of the Program will be pleased to offer assistance whenever requested.

Résumé

Un programme d'informatique appelé EXIR a été mis au point dans le cadre du système internationalement accepté, de communications, d'informations et de documentation sur les ressources génétiques, pourenregistrer, communiquer, corriger et mettre à jour les renseignements sur les ressources génétiques. Ce travail a été réalisé par le Programme IS/GR de l'Université du Colorado à Boulder, Etats-Unis, qui s'est disposé à fournir toute information complémentaire.

Resumen

Se ha elaborado un programa de almacenamiento y recuperación electrónica de información llamado EXIR, como parte del sistema internacionalmente aceptado - "Sistema de Comunicaciones, Información y Documentación sobre Recursos Genéticos" - para registrar, comunicar, corregir y actualizar información sobre plasma germinal. Realiza este trabajo el programe IS/GR de la Universidad de Colorado, Boulder, EE.UU., que tendrá mucho gusto en facilitar más información al respecto.

U.S. Germplasm Committee acts as watchdog

SCIENTISTS IN THE USA HAVE INFORMED THE GOVERNMENT THAT A PROPOSED NEW LAW COULD DRASTICALLY RESTRICT THE COUNTRY'S BADLY NEEDED SUPPLY OF EXOTIC CROP VARIETIES.

Crops in America have a very narrow genetic base and more than 98 percent of the country's crop production is based on species brought in from outside. But the proposed law - called Executive Order 11987 - could restrict the introduction of new varieties. So the US National Plant Germplasm Committee, acting as a watchdog, has contacted two government officials. The Chairman, Donald Barton, has written to the Secretaries at the US Department of Agriculture and at the Department of the Interior, expressing the Committee's concern.

In his letter he says: "The welfare of our crop agriculture is, to a major extent, dependent upon the plant genetic resources (germplasm) that we can introduce to this country from many parts of the world and use in crop improvement programs.

"Many exotic species of forage and range plants have proved of immense value to our livestock industry, itself based on exotic species.

"Therefore, this Committee views with concern the possible implications of Executive Order 11987.

"This Committee strongly recommends that it be represented on any departmental or inter-agency task group that may be appointed to develop guidelines on interpretation and implementation of the order."

Dr Barton said the Committee was, however, encouraged by a memorandum from the Department of Agriculture on the President's environmental message and concludes the letter: "We are sure that the President's sincere concern for enhancing environmental quality can be realized while at the same time avoiding unnecessary restrictions on the instruction and use of exotic plant germplasm."

NOTES FROM GENETIC RESOURCES CENTRES

BOLIVIA

The IBPGR provided funds to IICA (Instituto Interamericano de Ciencias Agricolas OAE, La Paz) to improve the storage facilities for Andean zone crops to be stored in Puno, and Cuzco. These crops include: quinoa, cañihua, *Lupinus mutabilis* and the roots and tubers as follows: *Oxalis tuberosa, Ollucus tuberosus,* and *Tropaeolum tuberosum.*

This work is part of the Programa Andes Altos IICA which maintains relationships between the institutions of the Andean centres from Colombia to Bolivia. This particular project links Peru and Bolivia.

BULGARIA

The Institute of Genetics and Plant Breeding at Sofia proposes to establish a new institute to deal with genetic conservation.

CANADA

Canada has agreed to store the world's base collections of millet and oats. The seeds will be stored at the Central Office, Canada Agriculture, the only base collection centre in the country. The move was initiated by the IBPGR, as part of its international programme for the seed storage of valuable germplasm collections. The first collection of millet arrived at the Central Office on 24 October 1977.

CHILE

The Institute of Plant Production at Valdivia in Chile maintains 350 clones of potatoes. During the past year the IBPGR finalized an agreement to fund the collection of semi-cultivated *Solanum tuberosum* and to make intensive collections of *S. brevidens,* a species with extreme resistance to certain viruses, from the Chiloe region.

COLOMBIA

The Instituto Colombiano Agropècuario (ICA), the maize genebank at Tulio Ospina, contains 4 387 accessions of which 1 660 come from Colombia and most of the others from Venezuela, Ecuador, Bolivia and Peru.

GERMANY (FDR)

In the Genbank-Informationsdienst (GID) No. 5 (November 1977) evaluation results for 74 *Lolium multiflorum* samples from all over the world are reported. Research has been carried out at the Institute of Plantbreeding at Göttingen University and seeds are being stored in the genebank as first, a base collection for long-term storage, and second as a working collection for delivery to breeders, institutes, etc.

INDIA

About 800 accessions of onion are currently maintained at the Tamil Nadu Agricultural University, Coimbatore, India.

Dr. R. Rajendran, Vegetable Breeder at the Indian Institute of Horticultural Research, Bangalore, informs us that a permanent germplasm and pollen bank will be ready by the end of 1978 to store seed material.

The Central Rice Research Institute at Cuttack maintains the National Rice Germplasm Bank. This genebank at present contains 14 905 viable accessions but stocks are kept at 40 different rice research stations in the country making a total of 48 728. Of these it is estimated that, allowing for duplicates, 24 000 local cultivars are represented.

INDONESIA

The Central Research Institute for Agriculture at Bogor maintains a national collection of rice germplasm, but lack of ad-

quate storage facilities caused the loss of most of the early collections. More recently, an air-conditioned room has been used as a temporary measure to store the seeds. By the end of 1977, 4 388 accessions of indigenous rice cultivars were in the collection. These comprise 3 248 lowland types, 859 upland types and 231 tidal swamp types. Of these, 3 082 are *indica* rice and 1 256 *javanica*.

ITALY

The Bari Germplasm Laboratory holds a large collection of pea *(Pisum)* germplasm and has evaluated 4 346 accessions for a range of morphological descriptors and disease susceptibility to: *Fusarium; Peronospora; Ascochyta; Erisiphe*. Small amounts of seeds are available for distribution. A catalogue has been produced using the EXIR program.

JAPAN

The Plant Germplasm Institute of the Faculty of Agriculture at Kyoto University, Japan, has offered to store wheat germplasm on a world scale at IBPGR's request.

The Seed Storage Laboratory is based in the Division of Genetics of the National Institute of Agricultural Sciences at Hiratsuka. It was established in 1966 and maintains a collection of 26 766 accessions of 138 crops, of which 8 177 are rice. New facilities are now under construction at Tsukuba Science City.

NEPAL

The Department of Agriculture established a coordinated approach for rice improvement in 1965 and from 1971 has been active in collecting, maintaining and using indigenous germplasm. In 1971, collections were made in 57 out of 75 districts of the country in collaboration with IRRI and USAID. About 780 accessions are maintained.

PAPUA NEW GUINEA

We are informed that the collection of bananas at Lae will continue to be funded by the Papua New Guinea Biological Foundation and that moves are afoot to duplicate the collection at the Laloki Research Station near Port Moresby.

PERU

The Programa Cooperativo de Investigaciones en Maíz has been concerned for the past 20 years with maintaining samples for use in breeding. Much of the material was collected in the 1950's, particularly from areas which were more readily accessible at that time but many have been lost due to the lack of good storage facilities. In 1977, the IBPGR provided funds to upgrade the existing storage facilities and for collections to be made in the coastal region of Peru. We are informed that traditional populations of maize still survive in the higher altitudes and in the many irrigated valleys running from the Sierra through the coastal desert zone to the coast.

PHILIPPINES

The National Genetic Resources Programme of the Philippines which is an integral part of the IBPGR coordinated regional programme for Southeast Asia has been collecting indigenous vegetables in the Philippines. This work is centred on the National Plant Genetic Resources Laboratory at Los Baños, which has collaborated with FAO to use UNEP funds in 1977.

The USSR Seed Stores at Kubanskaya, Krasnodar

USSR

The NI Vavilov Institute of Plant Sciences in the USSR has 255 000 samples of crop plants and their wild relatives, one of the biggest collections in the world.

The new long-term seed storage building at Kubanskaya (Krasnodar) is shown above.

NEWS ABOUT MEETINGS

WORKSHOP ON THE GENETIC CONSERVATION OF RICE GENETIC RESOURCES

This was held at Los Baños, from 12-15 December 1977, under the joint sponsorship of IRRI and IBPGR. There were 44 participants from 18 centres as well as staff from IRRI. The workshop surveyed the rice situation country by country and led to the development of a five-year collaborative collection plan for the systematic canvassing and assemblage of rice genetic resources in South Asia, Southeast Asia, West Asia, Africa and Latin America.

During one of the discussion sessions, descriptors and descriptor states were reviewed to prepare for standardization in the near future.

WORKSHOP ON CROP GENETIC RESOURCES

This three-day workshop was held from 4-6 January 1978 at the International Institute of Tropical Agriculture, Ibadan, Nigeria, organized by the Association for the Advancement of Agricultural Sciences in Africa (AAASA).

The aim behind the workshop was to create awareness at all levels of the need to conserve Africa's invaluable genetic resources and to bring together people from all over Africa to discuss how this could be done.

Several world experts attended the workshop to give help and advice, especially on the role of international and regional organizations.

FORUM ON THE PROSPECTS AND POTENTIAL USES OF THE WINGED BEAN

This was sponsored by the Asia Foundation (TAF), the Philippines Council for Agricultural and Resources Research (PCARR) and the Southeast Asian Regional Center for Graduate Studies and Research in Agriculture (SEARCA). It was held in Manila from 13-14 January 1978. The meeting was designed to give a general picture of the winged bean, its uses and itspotential use, as well as plans for future development. A report will be published later in the year.

IBPGR COCONUT CONSULTATION

An expert consultation on coconut genetic resources was held from 24-26 January 1978 at FAO Headquarters, Rome. The report of the meeting was presented to the fifth meeting of the IBPGR in February 1978. Full details will reported in the next issue of this Newsletter.

FIFTH INTERNATIONAL WHEAT GENETIC SYMPOSIUM

This symposium, organized by the Indian Society of Genetics and Plant Breeding, in collaboration with the Indian Council of Agricultural Research, was held from 23-28 February 1978. The proceedings of the symposium will be available in May, 1978 and will be of interest because of the session on conservation, classification and cataloguing of genetic resources, chaired by Sir Otto Frankel and Dr. J. Vallega. This followed a session on changing concepts in the evolution of wheat.

IBPGR EXPERT CONSULTATION ON FORAGE PLANTS OF SOUTH AMERICA

This Consultation will meet at the CIAT Headquarters in Cali, Colombia from 25-27 April 1978 under the auspices of CIAT/INTA/EMBRAPA.

IBPGR/GOVERNMENT OF INDIA WORKSHOP ON THE GENETIC RESOURCES OF SOUTH ASIA

This Workshop will take place at the National Bureau of Plant Genetics, New Delhi for Government representatives of Bangladesh, Bhutan, Burma, India, Nepal and Sri Lanka, from 9-12 May 1978.

IBPGR SOUTHEAST ASIA REGIONAL COMMITTEE

The first meeting of the IBPGR Southeast Asia Regional Committee for the cooperative programme on genetic resources will take place in Bogor, Indonesia sometime in July, 1978. This meeting includes official representatives of the governments of Indonesia, Malaysia, Papua New Guinea, the Philippines and Thailand.

REVIEW CONFERENCE ON LEGUMES

An international review conference on the broad aspects of the classification and use of legumes will be held at the Royal Botanic Gardens, Kew, UK from 24 July to 4 August 1978. The Conference is sponsored by the Royal Botanic Gardens and the Missouri Botanical Garden in conjunction with the Phytochemical Society, USDA and the University of Reading, UK. During the conference the following selected groups of crops will receive special attention: *Arachis, Glycine, Phaseolus, Psophocarpus* and *Vigna;* also fodder, forage and cover legumes, with particular reference to genetic diversity, classification, adaptation and breeding. The attendance is limited and is by invitation only.

SYMPOSIUM ON CASHEW NUTS

A symposium on cashew nuts, organized by the Commission for Tropical and Sub-tropical Horticulture of the International Society for Horticultural Sciences is to be held in Kerala, India in March or April 1979.

SYMPOSIUM ON THE GENETIC RESOURCES OF FORAGE PLANTS

A symposium on the genetic resources of forage plants will be held at Townsville, Australia, from 6-11 May 1979.

NEWS ABOUT PUBLICATIONS

Several publications have come out in the past few months which should be of special interest to those working with genetic resources.

The September 1977 issue of "California Agriculture" devoted its entire 40 pages to reports on germplasm. "California Agriculture" emphasises that the narrow genetic base of crop plants all over the world makes them particularly vulnerable to diseases and pests, and discusses what is being done both in the USA and elsewhere to correct this. The magazine covers everything from beach strawberries to garden peppers, concentrating especially on the work carried out by researchers from the University of California. The magazine reviews this work and the diversity of scientific approaches to the four main areas of genetic activity - exploration, collection, conservation and use. "California Agriculture" will be sent free on request from: Publications, University of California, Division of Agricultural Sciences, 1422 S. 10th Street, Richmond, CA 94804, USA.

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The IBPGR is credited in an article published by the English journal "Nature" in its issue of 4 August 1977. The article, predicting seed storability, is by Prof. Eric H. Roberts and R.H. Ellis of the Department of Agriculture and Horticulture of the University of Reading, UK. They have carried out experiments on seed storage temperatures. "Nature" can be obtained at any good library or for a reprint of the article, entitled: "Prediction of seed longevity at sub-zero temperatures and genetic conservation", write to: Prof. Eric H. Roberts, University of Reading, UK.

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Those people interested in new varieties of the winged bean should read the latest "Winged Bean Flyer" produced by the Department of Agronomy at the University of Illinois, USA. This is the second issue of this newsletter and contains information about the Asia Foundation, which is helping to coordinate an international effort on the winged bean. The Foundation sees the winged bean as the most promising crop for the developing countries. Single copies of the newsletter are available on request from Mrs. Joan Levy, Editor, "Winged Bean Flyer", Department of Agronomy, University of Illinois, Urbana, Illinois 61801, USA.

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The possibility of Ethiopia becoming one of the world's major food exporting countries is discussed in the Winter 1977 edition of "Span", a British magazine. Ethiopia is one of the centres of diversity of cultivated plants and hence its potential. Dr. E. Westphal, of the Agricultural University at Wageningen, Netherlands, discusses the traditional cropping systems still practised by the country's peasant farmers today.

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Newly published and expected to be much in demand, is a new IBPGR publication entitled "Tropical Vegetables and their Genetic Resources" written by G.H. Grubben of the Royal Tropical Institute, Amsterdam, the Netherlands and edited by D.A. Tindall and J.T. Williams.

Chapters cover solanaceous fruits (tomato, *Capsicum*, egg-plant); cucurbits (melons, pumpkins, cucumber, gourds, loofah and chayote); alliums (onions, shallots, Japanese bunching onion, garlic and leek); leguminous vegetables; brassicas; and leafy vegetables.

A range of other species of minor importance are also included and annexes deal with notes on collecting, a list of institutions involved with vegetable work, and vernacular names.

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Another excellent reference paper from Australia is: "Overseas Plant Collections, August 1971 to June 1976" from the Australian Plant Introduction Review (1977) 11:24-32 by P. Broué and J.P. Grace. It reports on 36 missions from Australia in which 3 175 accessions were obtained, 19.3 percent tropical pasture grasses, 13.5 percent tropical pasture legumes, 11.7 percent protein grain crops, 5.1 percent oil crops and 4.9 percent cereals.

Those interested in fruit and nuts should should read the "Fruit and Tree Nut Germplasm Resources Inventory," by H.W. Fogle and H.F. Winters of the Plant Genetics and Germplasm Institute, USDA, Beltsville, Maryland, USA. Published last June, it gives a computerized list of fruit clones, and should prove useful for breeders and other fruit workers trying to locate specific clones.

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An account of the forestry research programme supported by the International Development Research Centre is given in "Trees for People" by C. Sanger, G. Lessard and G. Poulson (19). The booklet provides useful facts on trees, food and people and emphasizes the need for tree species for shelter belts, stabilization of marginal land and for fuel.

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Other short papers which should be of interest include: "The Comparative Evolution of Pulse Crops" by J. Smartt, Department of Biology, Southampton University, U.K., Euphytica (1976) 25:139-143, "An Environmental Interpetation of the Origin of Asian Food Legumes" by R.O. Whyte, Indian Journal of Genetics and Plant Breeding, (1975) 35:61-68., and "The Taxonomic Geography and the Breeding of Fodder Legumes in South Asia", by R.O. Whyte, Forage Research, (1976) 2:19-24.

ABBREVIATIONS USED BUT NOT IN FULL IN THE TEXT

AVRDC	Asian Vegetable Research Development Center
BIOTROP	Southeast Asian Regional Center for Tropical Biology, Bogor, Indonesia
CIAT	Centro Internacional de Agricultura Tropical, Calî, Colombia
CIMMYT	Centro Internacional de Mejoramiento de Maiz y Trigo, Mexico
CSIRO	Commonwealth Scientific and Industrial Research Organiztion, Canberra, Australia
EUCARPIA	European Association for Plant Breeding
IARI	Indian Agricultural Research Institute, New Delhi, India
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics, Hyderabad, India
IRAT	Institut de Recherches Agronomiques Tropicales et des Cultures Vivrières, Paris, France
IRRI	International Rice Research Institute, Manila, the Philippines
ORSTOM	Office de la Recherche Scientifique et Outre-Mer, Paris, France
UNEP	United Nations Environment Programme, Nairobi, Kenya
WARDA	West African Rice Development Association, Monrovia, Liberia

Plant Genetic Resources Newsletter will be pleased to consider reports, notes and news from anyone working with genetic resources.

Please send manuscripts, typed in double space. Relevant photographs too, will be greatly appreciated but only if high quality black and white prints rather than colour prints or slides. Colour photographs will reproduce, but not without a considerable loss of quality.

The Newsletter will also review salient books, scientific papers and other publications.

All contributions should be sent to the Editor, AGPE, FAO, 00100 Rome, Italy.

El Noticiario de Recursos Genéticos Vegetales considerará con gusto informes, notas y noticias provenientes de aquellas personas trabajando en recursos genéticos.

Agradecemos el envío de los trabajos mecanografiados a doble espacio. También apreciaremos el envío de fotografías relacionadas con la materia, pero deberán ser impresiones de buena calidad preferiblemente en blanco y negro. Fotografías en color pueden ser reproducidas, pero con una apreciable pérdida de calidad.

El Noticiario también hará revisiones de libros, trabajos científicos y otras publicaciones.

Todas las contribuciones deben ser enviadas al Editor, AGPE, FAO, 00100, Roma, Italia.

Le Bulletin des Ressources Génétiques Végétales apprécierait de connaître les rapports, notes et nouvelles écrits par quiconque travaillant en relation avec les ressources génétiques.

Prière d'envoyer les manuscrits tapés en double interligne, accompagnés le cas échéant de photographies s'y référant, mais de préférence sous forme d'excellents tirages en blanc et noir plutôt que de tirages en couleurs ou de diapositives. Les photographies en couleurs peuvent être reproduites mais sans garantie de perte de qualité.

Le Bulletin passera en revue les livres les plus en vue, les notes scientifiques et autres publications.

Toute contribution sera envoyée à l'Editeur, AGPE, FAO, 00100 Rome, Italie.